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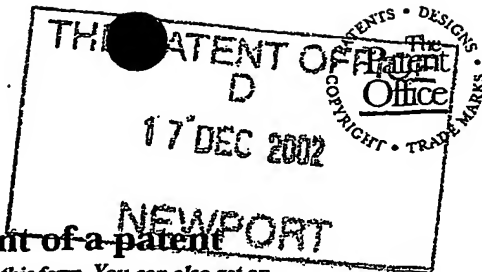
Signed

*He Behen*

Dated

22 January 2004

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P01/7700 0.00-0229302.5

# Request for grant of a patent

(See the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)

The Patent Office

Cardiff Road  
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South Wales  
NP10 8QQ

1. Your reference CNP12599GB

2. Patent application number  
(The Patent Office will fill in this part)

0229302.5

17 DEC 2002

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Keith John ANDERSON  
16 Braemar Drive  
Dunfermline  
KY11 8ES

Patents ADP number (if you know it)

85 28481001

If the applicant is a corporate body, give the country/state of its incorporation

4. Title of the invention HEATING DEVICE

5. Name of your agent (if you have one)

Cruikshank & Fairweather

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

19 Royal Exchange Square  
Glasgow, G1 3AE  
Scotland, UK

Patents ADP number (if you know it)

547002 ✓

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number  
(if you know it)

Date of filing  
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing  
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

No

- a) any applicant named in part 3 is not an inventor, or
  - b) there is an inventor who is not named as an applicant, or
  - c) any named applicant is a corporate body.
- See note (d))

# Patents Form 1/77

9. Enter the number of sheets for any of the following items you are filing with this form.  
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Continuation sheets of this form -  
Description - 7  
Claim(s) - -  
Abstract - -  
Drawing(s) - 3 & 3

10. If you are also filing any of the following, state how many against each item.

Priority documents -  
Translations of priority documents -  
Statement of inventorship and right to grant of a patent (Patents Form 7/77) -  
Request for preliminary examination and search (Patents Form 9/77) -  
Request for substantive examination (Patents Form 10/77) -  
Any other documents (please specify) -

11.

I/We request the grant of a patent on the basis of this application.

Signature

*C. Campbell*  
*A. Newell*

Date

16 December 2002

12. Name and daytime telephone number of person to contact in the United Kingdom

Mr Campbell Newell - 0131 225 4500

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## Notes

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**A HEATING DEVICE**

The present invention relates to a device suitable for use with, but not exclusively, an infant's feeding bottle, for heating a flow of liquid at storage temperature, passing through the device, to a temperature acceptable for drinking by an infant. The invention also relates to a drinking vessel, particularly an infant's feeding bottle.

10 The methods presently used for heating pre-prepared liquid drinks or feeds for an infant, such as heating in a microwave or standing in a pan of boiling water, have a number of disadvantages; the need for an external heat source is often an inconvenience, for example when the baby requires feeding away from home; overheating the liquid can occur, requiring the liquid to be cooled or discarded; the temperature of the liquid will reduce as the baby feeds, possibly dropping below the temperature the infant finds acceptable for feeding; heating the liquid takes time, if the baby is hungry this can lead to the baby becoming stressed.

These methods of heating have a further disadvantage in that they require heating the entire volume of liquid that has been pre-prepared; as the quantity of liquid the baby is likely to drink is unpredictable and some liquids, such as milk particularly breast milk, are not suitable for repeated reheating, unfinished liquid may need to be discarded.

It is an object of the present invention to avoid or minimise one or more of the above disadvantages.

The present invention provides a heating device, adapted for use with a drinking vessel suitable for containing a fluid, for example an infant's feeding bottle, the device including:

means for releasably connecting the device to a said vessel,  
so as to be in fluid communication therewith;

inlet means for receiving, in use, a flow of fluid from a  
5 vessel;

outlet means, for allowing, in use, a flow of fluid to leave  
the device, the outlet means being in fluid communication  
with the inlet means; and

means for heating a fluid, in use of the device, as it flows  
10 between the inlet means and outlet means;

whereby, in use, a flow of fluid from a vessel flows through  
the device from the inlet means to the outlet means and  
leaves the device through the outlet means at an elevated  
temperature.

15

Preferably the device further includes non-return means for,  
in use, preventing fluid that has passed through the inlet  
means from returning to the vessel. Desirably there is  
provided a non-return means on the outlet means to prevent  
20 fluid returning and coming into contact with the heating  
means.

The present invention provides, in a second aspect, a  
drinking system for an infant, to provide an infant with a  
25 liquid feed at an acceptable consumption temperature, the  
feeding system including:

a vessel suitable, in use, for storing a liquid feed at a  
storage temperature; and

a device for, in use, elevating the temperature of a liquid  
30 feed from the storage temperature to an acceptable  
consumption temperature, the device including:

means for connecting the device to the vessel, so as to be in  
fluid communication therewith,

inlet means for receiving, in use, a liquid feed from a vessel,

outlet means, in fluid communication with the inlet means, for allowing a liquid feed, in use, to pass to the infant;

5 and

means for heating a liquid feed, in use of the system, as it flows between the inlet means and outlet means;

whereby, in use, the liquid feed is drawn from the vessel, through the device, to an infant, and the temperature of the

10 liquid feed is elevated as it passes between the inlet means and outlet means of the device, from the storage temperature to an acceptable feeding temperature.

Preferably the feeding system further includes non-return

15 means formed and arranged to prevent fluid that has passed through the inlet means from returning to the vessel.

Desirably there is provided a non-return means on the outlet means to prevent fluid returning and coming into contact with the heating means.

20

The connection means may be a threaded connection, alternatively, it may be a push fit or other suitable connection.

25 The vessel may be a re-usable infant's plastic feeding bottle, or, alternatively, it may be some form of disposable bottle.

The inlet means may be an opening in the device.

30

The outlet means may be a mouthpiece, such as a teat, a spout or a straw, alternatively the device also includes means for coupling a mouthpiece, such as a teat, a spout or a straw.

Any suitable means for heating a said flow of fluid as it flows between the inlet means and outlet means may be used and could include a heat exchanger of the shell and tube type, or, alternatively it may be a heater element powered by  
5 electricity or heated by an exothermic chemical reaction.

If the heating means requires a power source this may be provided in the form of rechargeable batteries, or alternatively single use batteries.

10

The heating means may be activated by an on/off switch on the device or alternatively the device may be fitted with a fluid sensor that activates the heating means, in use, when it senses the presence of a flow of fluid between the inlet  
15 means and the outlet means.

A thermostat (or the like) is preferably included so as to ensure the temperature of the feed does not exceed a predetermined temperature.

20

The non-return means for preventing fluid that has passed through the inlet means from returning to the vessel may be a non-return valve, or, alternatively, the fluid may be prevented from returning by a restriction, which only opens  
25 under the action of the infant sucking.

Liquid feed is drawn through the device by the action of an infant sucking on the outlet means, alternatively liquid feed passes through the device due to the effect of gravity.

30

By virtue of the present invention an infant may be provided with a liquid feed on demand at a temperature acceptable for consumption without needing to first heat the whole body of the liquid feed in a microwave or pan of boiling water,

resulting in less wastage of liquid feed and reduced stress for the infant.

Embodiments of the invention will now be described by way of example, with reference to the accompanying drawings in which:

Figure 1 is a partially cut away perspective view of a device suitable for use with an infant's feeding bottle, for heating a flow of liquid according to an embodiment of an aspect of the present invention;

Figure 2 is a cross section taken through plane A-A shown on Figure 1;

Figure 3 is a side view of a feeding system for an infant, to provide an infant with a liquid feed at an acceptable consumption temperature, with the device shown in Fig. 1; and Figure 4 is an exploded view of the feeding system of Figure 3.

Referring to Figures 1 and 2, there is shown a partially cut away perspective view of a heating device suitable for use with an infant's feeding bottle, generally indicated by reference numeral 10, for heating a flow of liquid (Figure 1) and a cross section taken through plane A-A shown on Figure 2. The device includes a screw thread portion 12 for coupling the device to a vessel (not shown), an inlet 14 for receiving a flow of fluid from a vessel and an outlet 16 for allowing a flow of fluid to leave the device. The heating device 10 also includes heater elements 18 to elevate the temperature of a flow of fluid passing between the inlet 14 and the outlet 16. The heater elements 18 are powered by a rechargeable battery 20 mounted within the device. A second threaded portion 22 is also provided to allow a teat (not shown) to be coupled to the device. The device also includes a non-return valve, in the form of a flap 24 to prevent fluid



that has passed through the inlet 14 from returning to the vessel.

Referring to Figure 3, there is shown a side view of a feeding system, generally indicated by reference numeral 30, for an infant, to provide an infant with a liquid feed at an acceptable consumption temperature, with the device for heating a flow of liquid shown in cross section. The feeding system (shown in an inclined orientation) includes a vessel 38, with a base 68, containing a liquid feed 50 at storage temperature, a heating device 36 for elevating the temperature of the liquid feed 50 from the storage temperature to an acceptable consumption temperature, a teat 32 and a collar 34 to couple the device 36 with the teat 32.

The device includes a threaded portion for releasably coupling 52 the device 36 to the vessel 38, an inlet 54 for receiving the liquid feed 50 from the vessel 38, an outlet 56 for allowing the liquid feed to pass to the teat 32. The device also includes a heater element 58 to elevate the temperature of a flow of fluid passing between the inlet 54 and the outlet 56. The heater element 58 is powered by a rechargeable battery 60. A second threaded portion 62 is also provided to allow the teat 32 to be coupled to the device 36 by the collar 34. The device also includes a non-return, in the form of a flap 64 to prevent fluid that has passed through the inlet 54 from returning to the vessel. With the feeding system shown in an inverted orientation, it will be appreciated that such an orientation, in use, will be common for feeding an infant. The weight of the liquid feed 50 opens the flap 64 and creates a flow of liquid feed 50 through the device 36 to the teat 32. When the feeding system 30 is reverted to a normal upright orientation, allowing it to stand on its base 68, the flap 64 will close

preventing any of the heated liquid feed from returning to the liquid feed 50, still at storage temperature, in the vessel 38.

5 Referring to Figure 4, there is shown is an exploded view of the feeding system of Figure 3, generally indicated by reference numeral 30, for an infant, to provide an infant with a liquid feed at an acceptable consumption temperature. The feeding system includes a teat 32, a collar 34, a device  
10 36 for heating a flow of liquid at storage temperature, passing through the device, to a temperature acceptable for drinking by an infant, and a vessel 38 for storing a liquid feed at a storage temperature. The collar 34 couples the teat 32 to the heating device 36. The heating device 36  
15 includes an on/off switch 40 to activate the heating elements (not shown).

Various modifications and improvements may be made to the embodiments hereinbefore described without departing from the  
20 scope of the invention.

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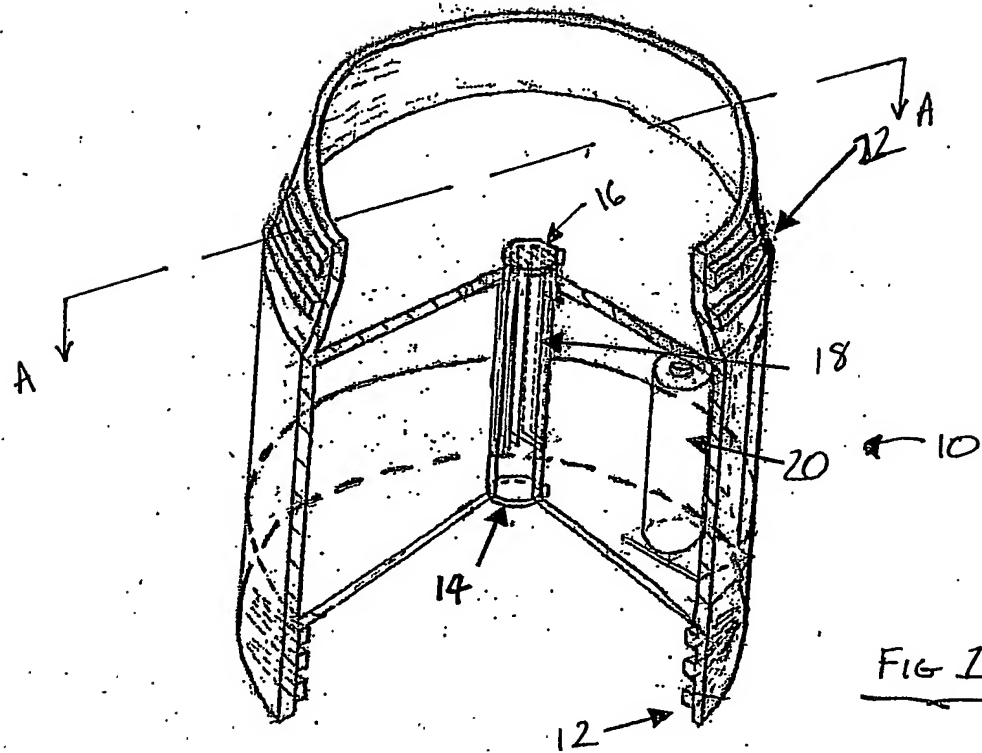


Fig 1

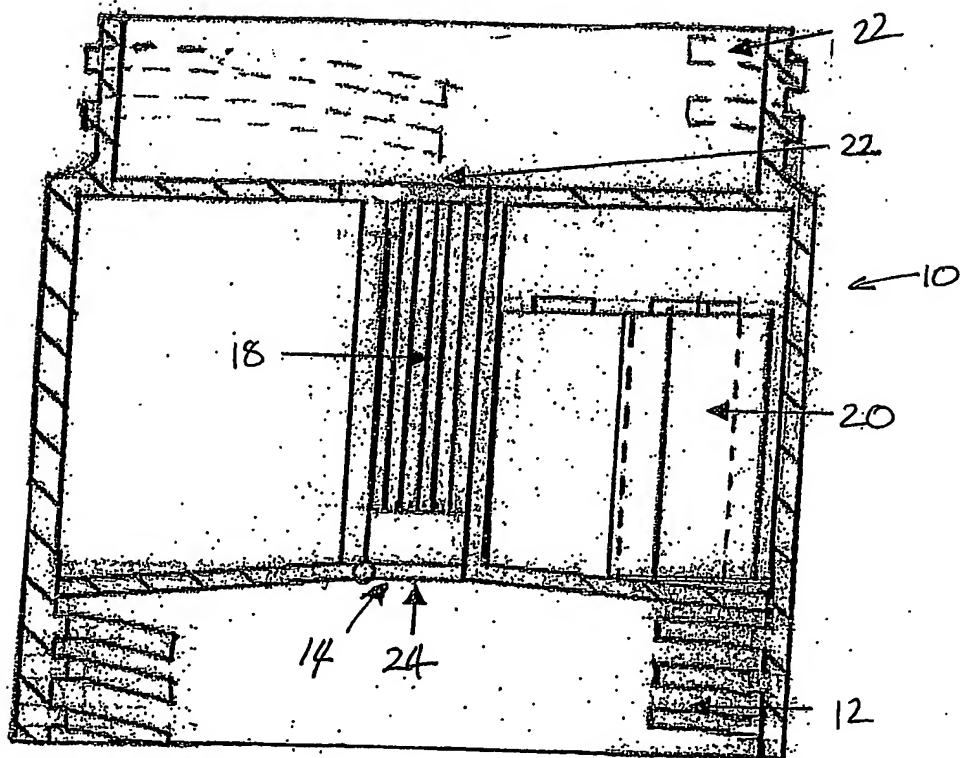


Fig 2

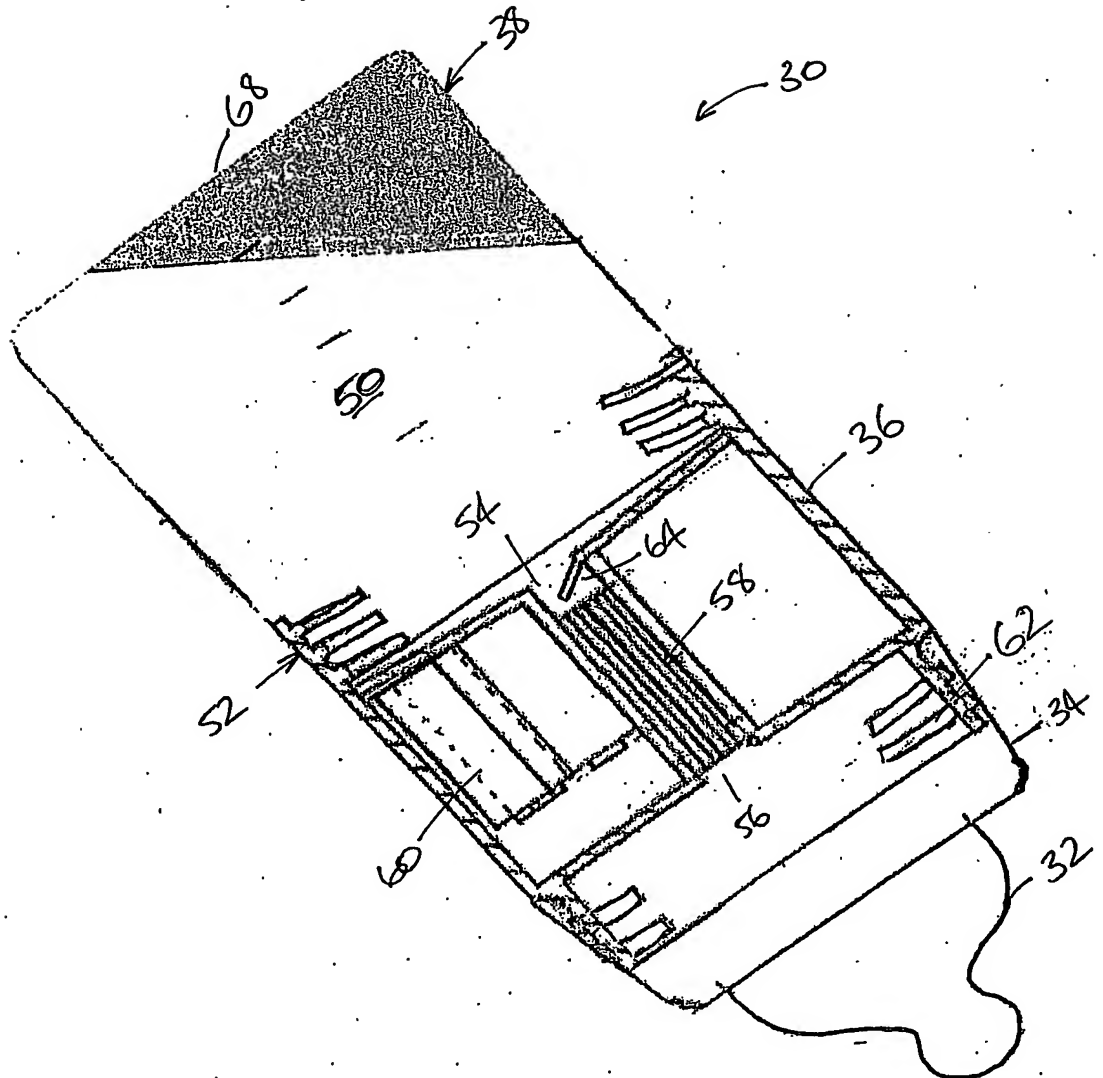


FIG 3

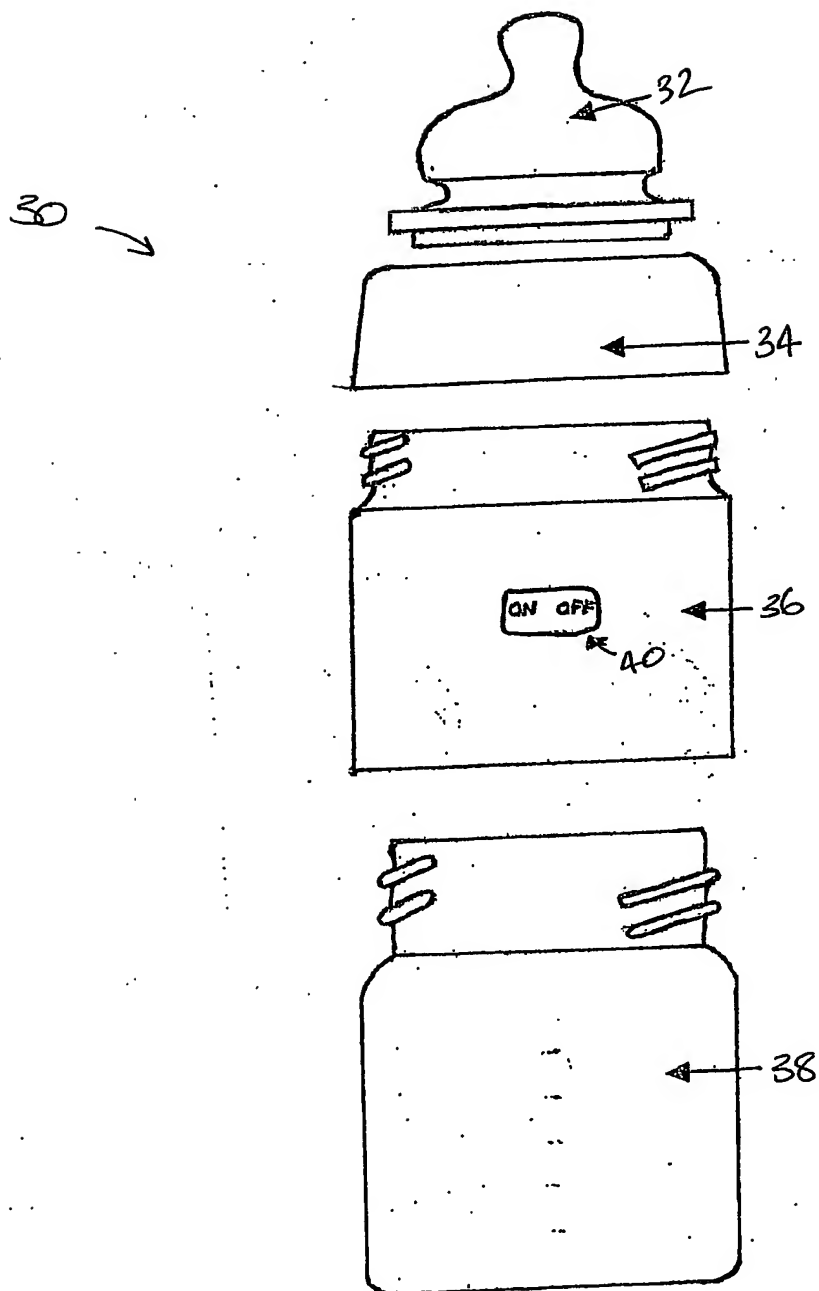


FIG 4

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